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ABSTRACT

Even a superficial review of the literature on cognition would suggest that philosophers of the past and psychologists of the present frequently were concerned with the same problems. For the past three centuries, psychologists and philosophers have relied upon the concept of cognition to describe complex human functions such as memory, thinking, problem solving, and planning. The term metacognition is now used by some authors to describe complex cognitive functions, but not by others. In this context, it is appropriate to raise the question, "What does the concept meta mean linguistically, and how has it been applied by some scholars to the process of cognition?" The differences between the concepts of physical and metaphysical as used by Aristotle are phenomenological, not just semantic. However, it is apparent that lack of clarity and some confusion exists in the psychological literature as to the use of the concept "metacognition". In the final analysis, metacognition might be a semantically useful concept, but one which does not explain anything new. (BW)

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In Search of Meta-Cognition

Phenomenological or a Semantic Issue?*

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It has been generally acknowledged by psychologists and epistomologists (v. Bertalanfy, 1959; Leontiev, 1972; Piaget, 1971), that in the process of biological and socio-cultural evolution humans have acquired species-specific ability to create a universe of symbols. As a consequence, in the absence of organic and instinctual adaption, humans create their own environment through a symbolic media (v. Bertalanfy, 1959). The power of symbols enables us not only to understand the present, but, also to profit from past experiences and to project into the future. From the position of biological evolution, the structure directly involved with abstract-symbolic process, e.g., generation of ideas and communication, is the human brain. The evolutionary process has been generally considered to be rather slow and it is a safe assumption that structurally and physiologically the human brain underwent hardly any changes since the recorded human history. One can also assume that if the organ did not change, the process did not change, either, to a significant degree.

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In view of this assumption, one may suggest that phenomenologically the process of cognition remained the same since the recorded human history.

Even a superficial review of the literature on cognition would suggest that philosophers of the past and psychologists of the present frequently were concerned with the same problems. For example, awareness of our actions and ability to know about our knowledge has been recognized by Descartes, and Spinoza in the 17th century and much earlier by philosophers. An expression attributed to Descartes: "Cognito ergo sum" (I know therefore, I exist) is a very strong expression of the importance of cognition. Likewise, "Knowing about knowing," is mentioned in the writings of Spinoza, who stated: "If a man knows anything, he by that very fact knows that he knows it." (Sahakian, 1968; p. 35).

It is evident that for the past three centuries psychologists and philosophers relied upon the concept of cognition to describe complex human functions such as memory, thinking, problem solving and planning. Some contemporary writers maintain that our understanding of complex cognitive functions differs insignificantly from that of ancient philosophers.

Heil (1983) for example, suggests that ..." Theories of memory seem to have moved little beyond Plato and Aristotle

except that computer discs have replaced wax tablets as models of storage mechanisms" (p. 224.)

Recently, new concepts with the prefix "meta" e.g., meta-cognition (Glaser, 1984; Brooks and McCauley, 1984; Campione, et al., 1982;), metacomponents (Wagner and Sternberg, 1984), metaanalysis (Kulik, Kulik and Schwabb, 1983; Glass, 1976; Cohen, 1981; Kavale, 1981; Wilson and Putnam, 1982), metatheoretical (Shapiro, 1984), metacontrolling (Levy, 1982), meta-planning (Wilensky, 1981); have been introduced into educational and psychological literature.

More recently the concept of metanalysis has been extended to research in the field of special education (Kavale, 1984; Guskin, 1984; Lindelar and Wilson, 1984). However, this approach in research integration has been criticized by Eysenck (1984). He expressed caution that the "simplistic" scoring system of metaanalysis are not only useless but may be counterproductive.

Furthermore, a number of scholars made reference to meta-cognitive skills (Brown, 1978, 1980; Flavell, 1976; Snow, 1980) and programs have been designed to develop such skills (Whimbey and Lockhead, 1980; Belmont, Butterfield and Ferretti, 1982).

Belmont, et al. (1982) proposed a program to train metacognitive skills. The program involves the following steps: (a) decide on a goal, (b) make a plan to reach the goal, (c) try the plan, (d) ask whether the plan worked; if the answer is in the affirmative, you have accomplished your goal, if not, proceed to the next step; (c); if the answer is "yes" proceed to

the next step and ask what was wrong with the plan and start again with step (b).

It is the impression of this writer that the use of the prefix "meta" to describe complex cognitive functions is more widespread among certain professional journals than the others. Review of recent issues of Cognition, Cognition and Brain Theory, Cognitive Psychology, Cognitive Science, revealed only two studies addressing the question of metacognition (Levy, 1982; Wilensky, 1981). It appears that Journals primarily devoted to the study of cognition were not the ones which introduced the concept. The concept of metacognition appears more frequently in such journals as: Review of Educational Research, Educational Researcher, American Educational Research Journal. One can also mention here that a number of books on cognition do not discuss the concept of metacognition (Anderson, 1975; Milner and Glickman, 1965; Luria, 1966; Heil, 1983; Glass, Holyoak and Santa, 1979), while they discuss complex cognitive functions, e.g., "executive-system."

In this context, it is appropriate to raise the question "what does the concept meta, mean linguistically?, and how it has been applied by some scholars to the process of cognition?

The prefix "meta" has been derived from the Greek language where its meaning describes such concepts as: "between, with, after, beyond, transcending, higher", (Webster, 1960). Aristotle used a title of "metaphysics" to describe his philosophical treatise which discussed abstract phenomena, "beyond" the grasp of observable physical world. The difference between the

concepts of physical and metaphysical as used by Aristotle was phenomenological, and not just a semantic one. However, it is apparent that lack of clarity and some confusion exists in the psychological literature of the present time as to the use of the concept "metacognition."

Wagner and Sternberg (1984), refer to metacomponents as "higher order" control process that is used for executive decision making in problem solving. They clearly imply the difference between metacognitive and cognitive skills by maintaining that "... successful programs must be directed toward metacognitive and cognitive levels, as well as toward their interaction" (p. 213). Brooks and McCauley (1984), describe metacognitive operations as "more sophisticated" processes that are involved in awareness, monitoring, or attention to one's own set of cognitive operations and strategies. Campione, Brown and Ferrara (1982), mention metacognition as a "self-regulatory" skill used by a learner while solving problems, e.g., "Checking the outcome of any attempt to solve the problems, planning one's next move, monitoring the effectiveness of any attempted action, and testing, revising, and evaluating one's strategies for learning." (p. 434). More recently, Glaser (1984), defined as metacognition abilities present in "mature learners," such as knowing what one knows and does not know. In general, most of the publications about metacognition investigate knowledge about cognition and regulation of cognition.

An attempt to describe the nature of complex cognitive

self-regulation was made by Pushkin (1969) and by Levy (1982). Pushkin referred to the complex self-regulation as "gnostic" or "holistic." This concept was used to describe productive intellectual process. He stressed that thinking as a process involves some factors of a psychological nature, such as; motives of the thinker and his relationship to the problem which he is attempting to solve. Pushkin further indicated that in order to analyze thinking as a process, we have to know not only its results, but also dynamics of cognitive elements which comprise problem situations requiring solution.

Similar ideas have been more recently expressed by Levy (1982), who suggested that there exist metacognitive programs that allocate control of processing of information and behavior to one hemisphere or the other in accordance with the nature of the task. He expresses a belief that ..." information processing in the nervous system and the allocation of neural systems in the service of such processing is governed by programs of meta-control that depend on the perceived nature of task demands" (p. 201).

This statement would suggest a high degree of complex control by the organism which apparently is a self-automated unconscious process. Levy would seem to agree with such an interpretation. As a matter of fact on the same page of his report, he provides additional explanation: "The meta-control hypothesis would predict that if a task is perceived to be linguistic, processing control would be allocated to the left hemisphere" (p. 201).

Further in the same report, we find a following statement: "The results of the chain-pattern test strongly suggested that a hemisphere takes control of processing not in accordance with its actual competencies for the particular task presented, but rather in accordance with its beliefs regarding the general nature of the problem presented" (p. 204). It is preceisely the point that the human brain functions as a self-regulating unit which acts "according to the general nature of the problem presented," which is difficult to comprehend within the framework of empirical psychology. Levy himself acknowledges that there are serious questions in respect to neurological interpretation. He admits that only speculations can be offered at the present time, since ... "we have no direct neurological measurements of the activities occuring at the various levels of the nervous system.... When instructions are given (or a problem is presented), it is reasonable to asume that both hemispheres of the split-brain patient respond by processing the nature of task requirements and then comparing the outcome of this processing with a belief structure regarding the competency to carry out the task" (p. 206).

It is Levy's reference to "a belief structure" which shifts debate on metacognition from a psychological into a philosophical realm.

The problem with such concepts as "gnostic" or "programs that allocate control" is that in their attempt to explain they really do not explain anything but raise more questions. For the past hundred years, since the establishment of Wundt's

laboratory at the University of Leipzig in 1879, psychology has been hard at work in an attempt to prove itself as a science of behavior. However, occasionally when easy answers are not forthcoming, psychologists find themselves faced with a need for philosophical explanations. It would seem to be appropriate here to quote from Heil (1983), who while writing about cognitive psychology said: "What seems to be missing amid all the masses of data, however, is any sort of general agreement on how it fits together. In reading through cognitive psychological literature on virtually any experimental topic, one feels comforted so long as one sticks to details. Once broader, more general claims begin to be advanced, however, one's confidence wanes" (p. 227).

This writer would like to suggest that substituting new concepts like metacognition to describe cognitive process is not a discovery of a new phenomena. To derive concepts like metacognition, metacontrol or executive thinking, we have to rely upon cognitive process which did not change phylogenetically at least since the time of Aristotle and Plato. It would appear that cognition and metacognition are not qualitatively different concepts. In the final analysis, metacognition might be a semantically useful concept, but one which does not explain anything new.

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